

THE CLAIMS

1. (Currently Amended) A component mounting apparatus for picking up electronic components supplied from a component supply section ~~by suction nozzles attached to a mounting head~~ and mounting the electronic components on a printed circuit board, ~~said apparatus mounting components in ascending order of height, the component mounting apparatus~~ comprising:

a mounting head having a plurality of suction nozzles;

~~at least one suction nozzle attached to the mounting head; and~~

~~a control section means for containing storing information on relating to a predetermined sequence that such the electronic components are supplied to the mounting head, the information comprising electronic component height and position information; to be mounted and for moving, based on said information, at least one of and~~

means for controlling the positions a position of the suction nozzles, the mounting head and ~~the~~ a printed circuit board based on the information stored in the means for storing; so that ~~the~~ electronic components provided in the predetermined sequence to be mounted are mounted in ascending order of height on a printed circuit board.

2. (Currently Amended) A component mounting apparatus for mounting components in ascending order of height, comprising:

a component supply section for supplying electronic components in a predetermined sequence to be mounted;

a mounting head having ~~at least one~~ suction nozzles for picking up the electronic components from said component supply section and mounting the electronic components on a printed circuit board;

a data section for storing information on the predetermined sequence, the information comprising electronic component height and position information relating to components to be mounted;

a component mounting section for positioning ~~and fixing said changing positions of said at least one~~ plurality of suction ~~nozzle~~ nozzles, the mounting head and a printed circuit board based upon the height and component information stored in the data section; and

a control section connected to the data section ~~and the mounting section~~ for controlling ~~operations of said suction nozzles~~ based upon the predetermined sequence, the mounting head and the component providing control signals to the mounting section; and section, wherein

~~a data section containing information on the components to be mounted,~~

~~wherein the positions of the suction nozzles, at least one suction nozzle, the mounting head and the a printed circuit board are driven and controlled so that the electronic components are mounted in ascending order of height based on height data~~ the information previously on relating to the components to be mounted, said height data being supplied from stored in said data section.

3. (Currently Amended) A component mounting apparatus, for mounting components in ascending order of height, comprising:

a component supply section that supplies electronic components in a predetermined sequence for supplying components to be mounted;

a mounting head having a plurality of suction nozzles placed ~~at least one suction nozzle located~~ in a circular ~~form~~ pattern for picking up the electronic components from said component supply section and for mounting the electronic components on a printed circuit board;

a data section for storing information ~~relating to components to be mounted on the predetermined sequence, the information comprising electronic component height and position information~~;

a component mounting section ~~for positioning and fixing said changing~~ controlling the positioning positions of said at least one suction nozzle nozzles, the mounting head and a printed circuit board; and

a control section connected to the data section and the component mounting section, the control section for providing control signals to said component mounting section for controlling vertical movements of said suction nozzles, intermittent rotations of the mounting head and horizontal movements of the component mounting section; ~~and section, wherein a data section containing information on the components to be mounted, wherein the movements of the suction nozzles, at least one suction nozzle, the mounting head and the a printed circuit board are driven and controlled so that the~~ to mount such electronic components supplied in the predetermined sequence are mounted in ascending order of height based on ~~height data on the relating to components to be mounted, said height data being~~ the information supplied from said data section.

4. (Previously Presented) A component mounting apparatus for mounting components in ascending order of height, comprising:

a component supply section for supplying electronic components ~~to be mounted in a~~ predetermined sequence;

a mounting head having at least one suction nozzle for picking up the electronic components from said component supply section and mounting the electronic components on a printed circuit board;

a data section for storing information ~~relating to components to be mounted on the~~ predetermined sequence, the information comprising electronic component height and position information;

a component mounting section ~~for positioning and fixing said changing positions~~ controlling the position of said at least one suction nozzle, the mounting head and a printed circuit board; and

a control section connected to the data section and the mounting section for providing control signals to said mounting section for controlling vertical movements of said suction nozzles and horizontal movements of the mounting head; ~~and head, wherein~~

~~a data section containing information on the components to be mounted, wherein the movements of the suction nozzles~~ at least one suction nozzle and the mounting head are driven and controlled so that the components supplied in the predetermined sequence are mounted in ascending order of height based on ~~height data on the relating to components to be mounted, said height data being~~ the information supplied from said data section.

5. (Canceled)

6. (Withdrawn) A component mounting method for picking up components supplied from a component supply section by suction nozzles attached to a mounting head and mounting the components on a printed circuit board, for mounting components in ascending order of height, comprising:

providing information relating to components to be mounted; and

driving the positions of the suction nozzles attached to the mounting head, the mounting head and the printed circuit board so that the components are mounted on the a printed circuit board in ascending order of height based on said information on the components to be mounted, said information having been provided inside beforehandbefore said driving positions.

7. (Withdrawn) The component mounting method according to claim 6, wherein the target components to be mounted whose distance from other components is narrower than a predetermined value are judged to belong to a same group and the components belonging to a first group are mounted in ascending order of height within the first group.

8. (Withdrawn) The component mounting method according to claim 6, further comprising:

loading data on relating to the shape, size and mounting positions of the components to be mounted and calculating, based on said data, a distance between the mounted components;

classifying the components whose calculated inter-component distance is narrower than a predetermined value into one group;

forming another group for those components whose calculated inter-component distance is wider than the predetermined value; and

deciding the an order of mounting the components in said one group so that the components which are lower are mounted first are mounted in ascending order of height.

9. (Withdrawn) The component mounting method according to claim 6, further comprising:

classifying the components into a plurality of component groups according to the mounting positions of the such classified components and then deciding the an order of mounting the such classified components;

loading data on the shapes, sizes and mounting positions of said components to be mounted;

calculating distances between the components to be mounted based on the loaded data;

rearranging those components whose distance from a predetermined component is narrower than a predetermined value value, said distance being a narrow inter-compount distance, so that the components having a the narrow inter-component distance are arranged in ascending order of height;

checking whether all the components have been completed with the above operation; subjected to said rearranging; and

mounting the rearranged components according to said rearranged order.

10. (Withdrawn) The component mounting method according to claim 8 or claim 9, further comprising:

checking whether there are any lower components having a height lower than all other components that should be mounted first when the a distance of the such components from neighboring components is narrower than a predetermined value;

when there are components to be mounted, checking whether the mounting of the components that should be mounted first has been completed; and

mounting the such components on the a printed circuit board.

11. (Currently Amended) A component mounting apparatus for mounting components in ascending order of height, comprising:

a control section for deciding an order of mounting components supplied in a predetermined sequence to be mounted, based on previously stored information relating to of mounting positions and heights of such components to be mounted, ~~so that such components are mounted~~ to mount the components in ascending order of height; and

a mounting head having suction nozzles for picking up components from a component supply section and mounting the components on a printed circuit board.

12. (Previously Presented) The component mounting apparatus of claim 11, further comprising:

a classifier for classifying into at least one group adjoining components spaced apart from each other at a distance shorter than a predetermined value, wherein said control section is for determining an order of mounting components of each said group.

13. (Currently Amended) The component mounting apparatus according to claim 11, further comprising a data section containing the information relating to mounting positions and heights of the components to be mounted.

14. (Currently Amended) The component mounting apparatus according to claim 12, further comprising a data section containing the information relating to mounting positions and heights of components to be mounted.

15. (Withdrawn) The component mounting method according to claim 9, further comprising:

checking whether there are any components having a height lower than all other components that should be mounted first when a distance of such components from neighboring components is narrower than a predetermined value;

when there are components to be mounted, checking whether mounting of components that should be mounted first has been completed; and

mounting such components on a printed circuit board.